
Integrity - Service - Excellence

GPS Constellation Status



25 Sept 2006

1st Lt Charlie Bellows
2D Space Operations Squadron

U.S. AIR FORCE



U.S. AIR FORCE

Constellation Summary

- **Constellation Status**
- **Navigation Performance**
- **Satellite Vehicle Position**
- **Legacy Accuracy Improvement Initiative (LAII)**



U.S. AIR FORCE

Constellation Status

Since 1 Oct 05

- **29 operational on-orbit satellites**
- **1 satellite decommissioned**
 - SVN-31: October 05
- **Upcoming launches**
 - SVN-52: NET 25 Sep 06
 - SVN-58: NET 14 Nov 06



U.S. AIR FORCE

Constellation Status

■ Component changes

- SVN-39 clock swap from Cs to Rb to Cs Oct/Dec 05**
- SVN-25 clock swap from Cs to Rb Dec 05**
- SVN-25 NDU power supply failure Dec 05 - swapped to A side**
- SVN-25 NDU baseband swap Jun 06**
- SVN-30 clock swap from Rb to Rb to Cs March/Jun 06**
- SVN-33 clock swap from Cs to Rb to Rb Jun/Aug 06**
- SVN-29 clock swap from Rb to Rb Aug 06**
- SVN-15 clock swap from Cs to Rb to Rb starting Aug 06**
- SVN-54 L1 HPA swap Sep 06**
- SVN-51 L2IPARFP telemetry value dropping Aug 06 - appears to be a sensor issue versus a component issue, monitoring**

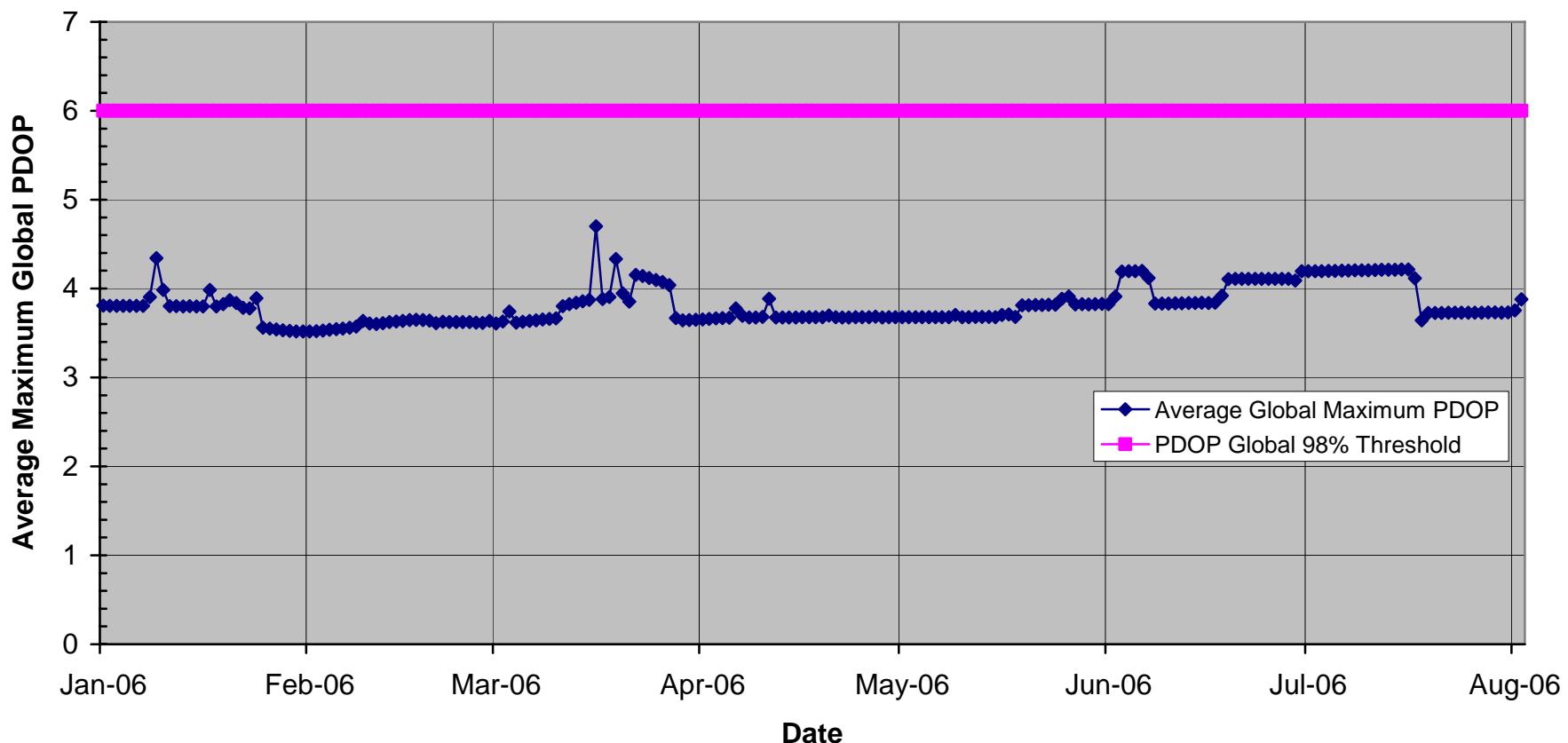
**2 SOPS WILL CONTINUE TO ENSURE GPS
PERFORMANCE SUPPORTS ALL USER REQUIREMENTS**



Navigation Performance

U.S. AIR FORCE

Global PDOP Trend 2006

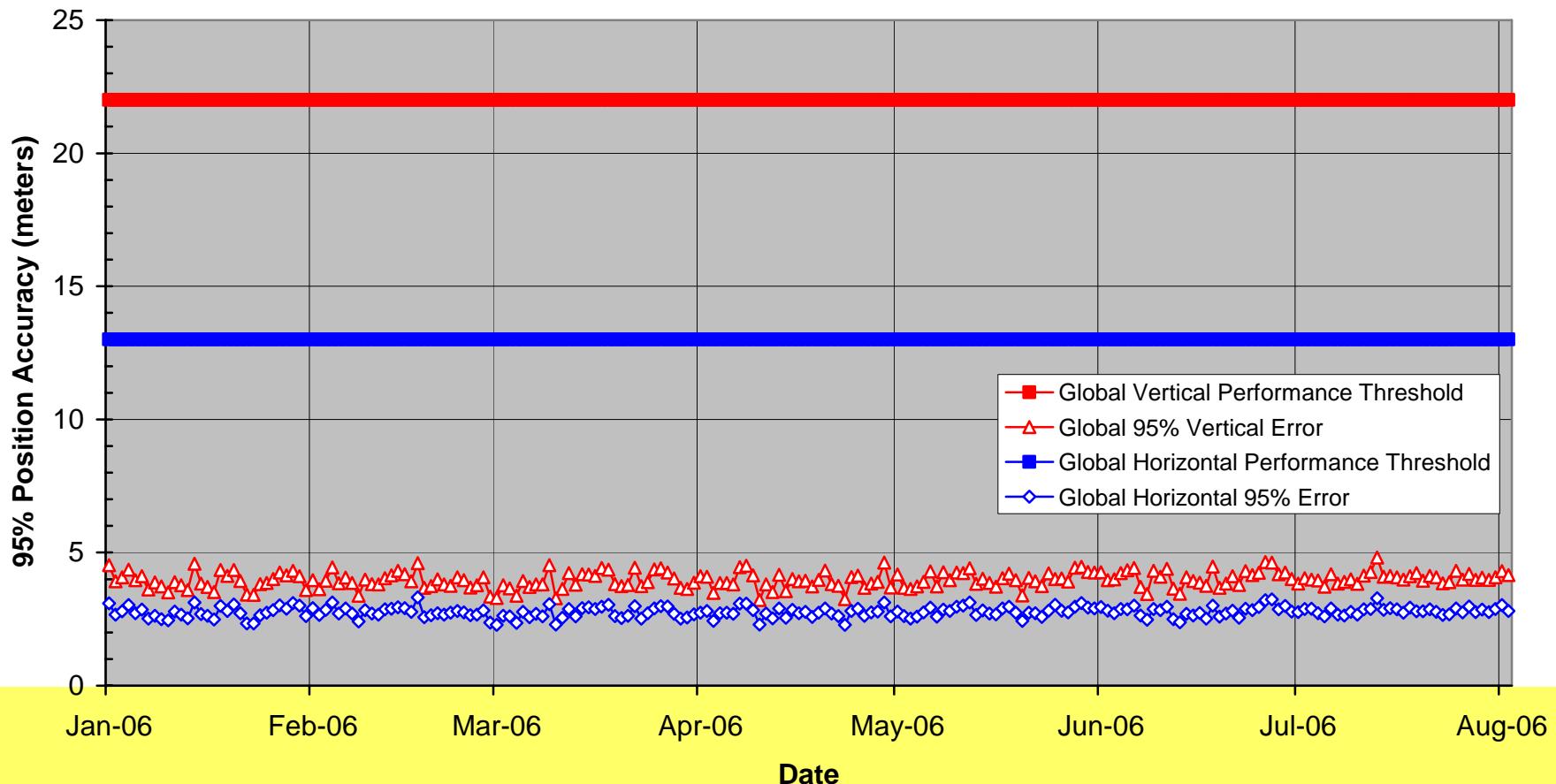




Navigation Performance

U.S. AIR FORCE

Global GPS Position Accuracy 2006

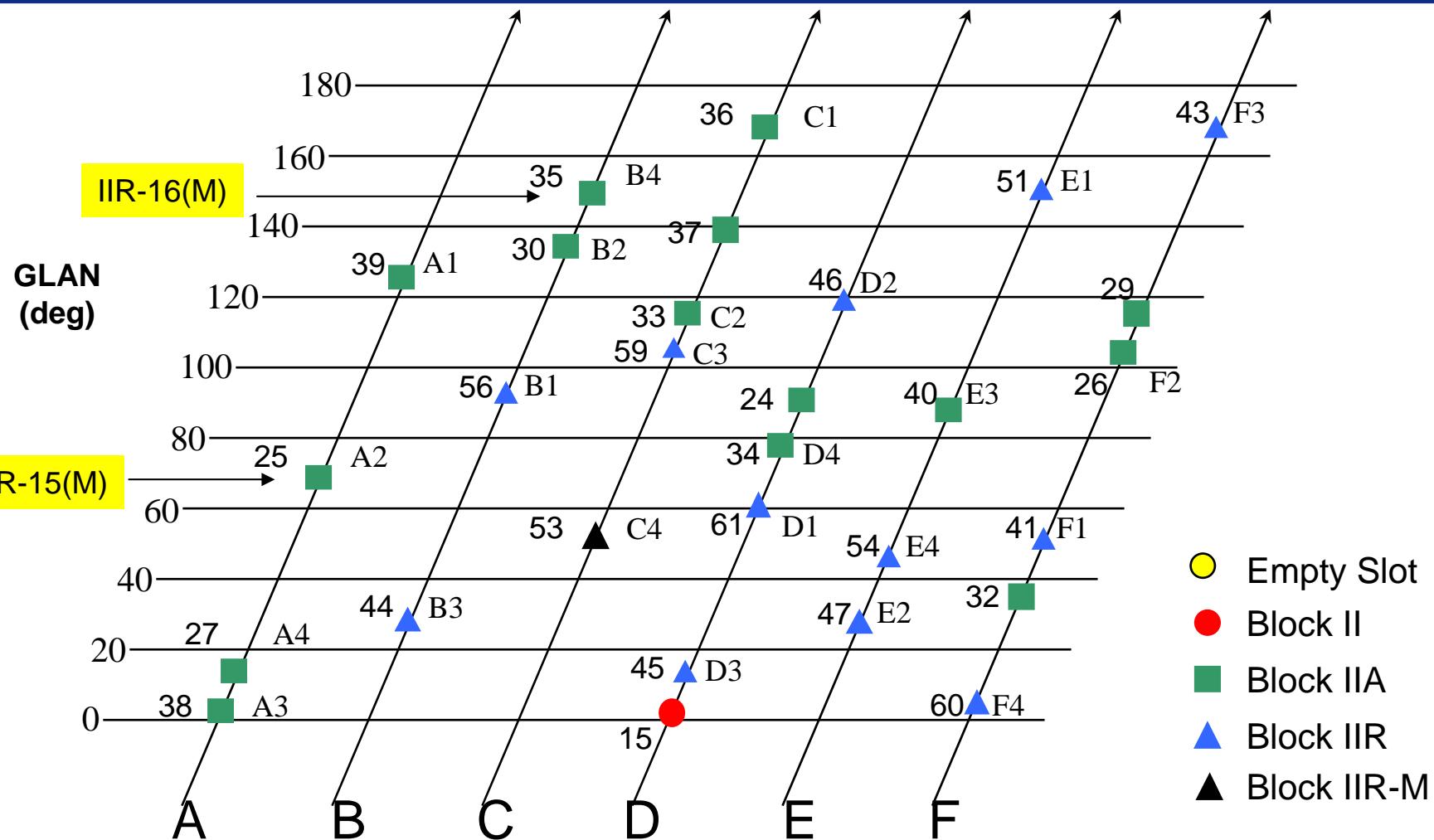


CONSTELLATION EXCEEDS ALL PERFORMANCE REQUIREMENTS



U.S. AIR FORCE

GPS Locations 6 Jul 06





*GPS Space and Control
Clock and Reaction Wheel
Performance Status*
(as of 06 Jul 06)

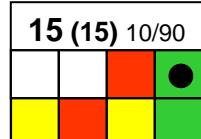
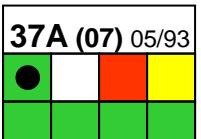
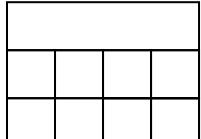
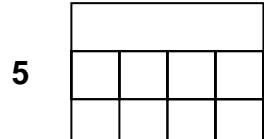
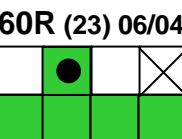
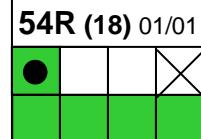
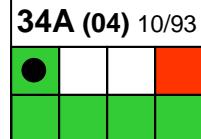
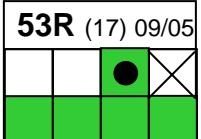
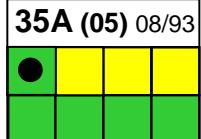
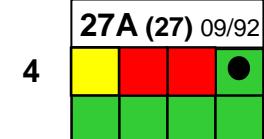
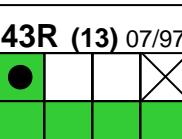
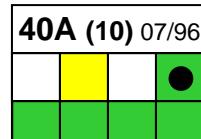
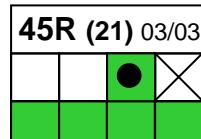
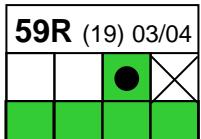
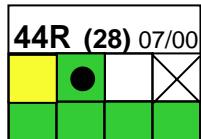
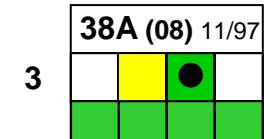
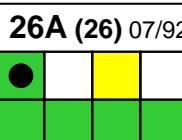
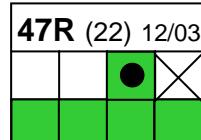
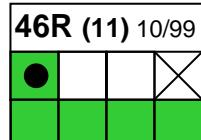
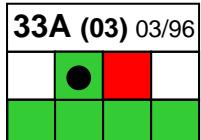
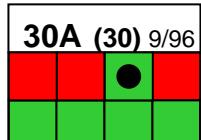
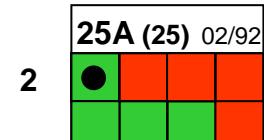
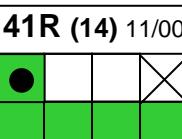
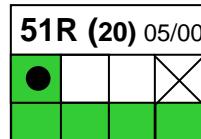
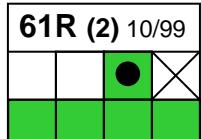
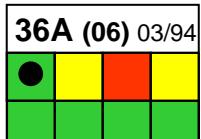
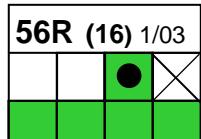
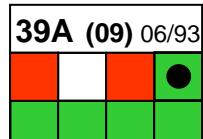
Watch List			
SVN (PRN)	1	2	3
Clock*	1	2	3
Wheel	1	2	3
* II/IIA = Rb, Rb, Cs, Cs IIR = Rb, Rb, Rb Diagonal Line = Unhealthy	4	4	

Clock
meets spec
watch list
dead
unused
in use

Wheel
functional
watch list
dead
unused

U.S. AIR FORCE

PLANE A





Legacy- Accuracy Improvement Initiative (L-AII)

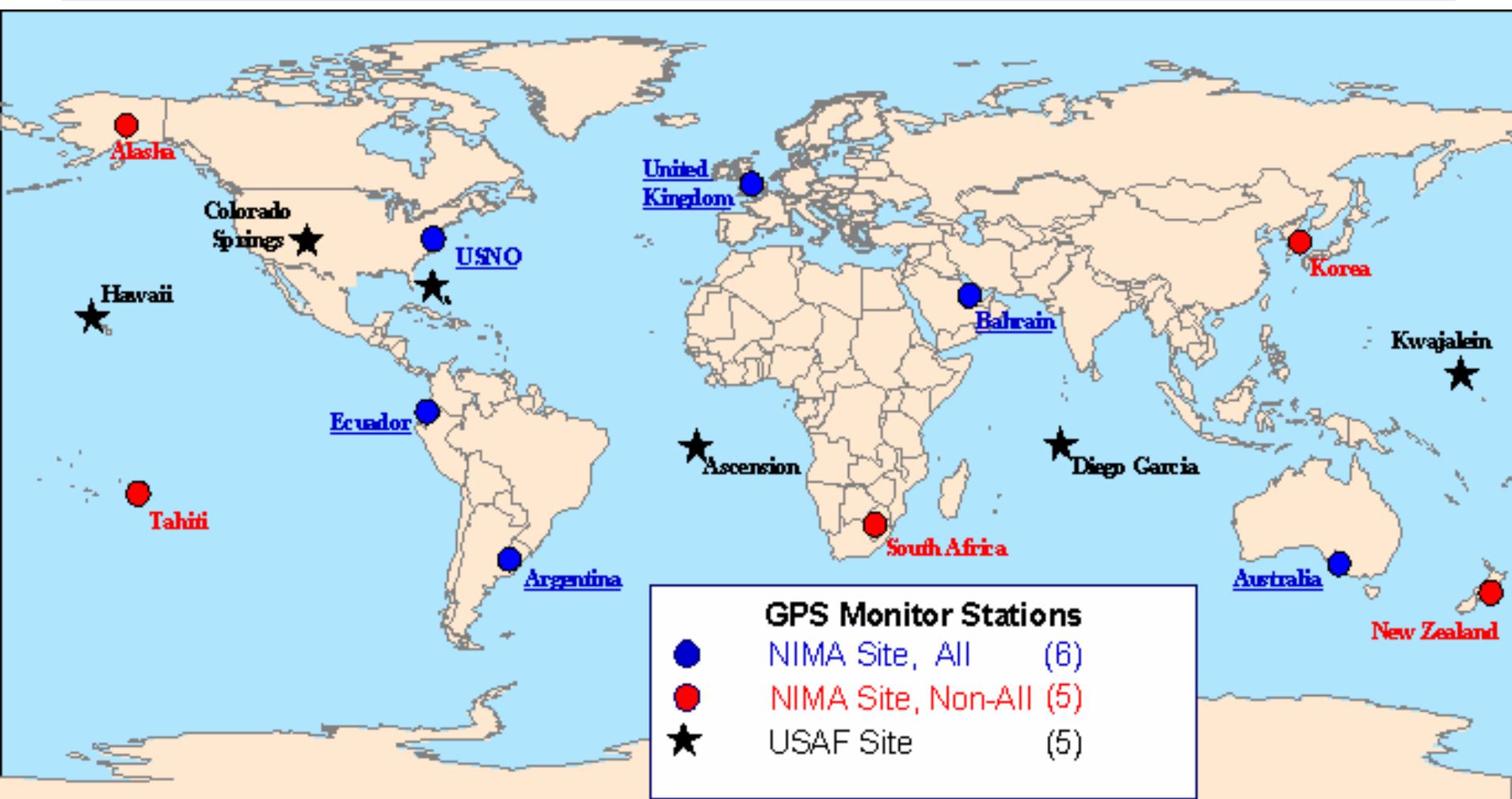
U.S. AIR FORCE

- 15-min National Geo-Spatial Intelligence Agency (NGA) smoothed data into Kalman Filter and by default user nav/timing service
- 6 NGA Monitor Stations (MS), in synergy with existing OCS stations
- Update to several mathematical models for ephemeris processing enhancements
- 6 phases of implementation, currently in Phase 4
- Overall L-AII user benefits: 51.6% increase in Zero Age of Data
16.9% increase in Signal-In-Space
- Addition of 6 NGA MSs = 100% coverage of all satellites 24/7
 - Immediate anomaly detection, protecting users



U.S. AIR FORCE

USAF & NGA Monitor Stations





U.S. AIR FORCE

Contact Info

Lt Charlie Bellows
2nd Space Operations
Squadron
719.567.3954 (DSN 560)